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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,742	10/12/2001	Alex David Colvin	201-0006 CLH	6527

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KEVIN G. MIERZWA
ARTZ & ARTZ, P.C.
28333 TELEGRAPH ROAD, SUITE 250
SOUTHFIELD, MI 48034

EXAMINER	
DOLE, TIMOTHY J	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/682,742	COLVIN ET AL.	
	Examiner	Art Unit	
	Timothy J. Dole	2858	

-- The MAILING DATE of this communication appears on th cover sheet with the correspondenc address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 20, 2003 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Murdock (USPN 3,906,354).

Referring to claim 1, Murdock discloses a conductivity sensor (fig. 2) comprising: a first annular electrode having a first inner diameter (fig. 2 (18)); a second annular electrode having the first inner diameter (fig. 2 (19)); and a tubular portion (fig. 2 (12) and (13)) disposed axially between said first electrode and said second electrode (fig. 2), said tubular portion defining a sensor cell with said first annular electrode and said second annular electrode (column 3, lines 9-51); said cell having a second inner diameter

that is greater than said first inner diameter (fig. 2) and a cell length between said first electrode and said second electrode (column 3, lines 9-51); said first electrode and said second electrode extending axially from said tubular portion (fig. 2).

Referring to claim 2, Murdock discloses the sensor as claimed wherein said cell has a cell constant defined by the formula: $\pi D_2^2/4L$ where D_2 is said second inner diameter (column 4, lines 1-5). It should be noted that Murdock discloses a cell constant equal to L/A where L is the length between the electrodes and A is the cross sectional area. Therefore, substituting for $A = \pi R^2$ and $R = 2D$, where R is the radius and D is the diameter, the cell constant of Murdock can be made to be equal to $\pi D_2^2/4L$.

Referring to claim 16, Murdock discloses a method of assembling a conductivity sensor comprising: coupling a first annular electrode having a first inner diameter to a tubular portion; coupling a second annular electrode having the first inner diameter to the tubular portion so that the tubular portion is positioned axially between said first electrode and said second electrode and so that the first electrode and the second electrode extend axially from the tubular portion, and defining a sensor cell having a second inner diameter that is greater that said first inner diameter with said first annular electrode, said second annular electrode and said tubular portion (column 2, line 65 – column 3, line 51).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murdock in view of Jeter (USPN 3,866,678).

Referring to claim 3, Murdock discloses the sensor as claimed except for a seal material between said first annular electrode and said tubular portion.

Jeter discloses a sensor with a seal material (column 5, line 47-49) between a first annular electrode (fig. 1A (24)) and a tubular portion (fig. 1B).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the seal material of Jeter into the conductivity sensor of Murdock for the purpose of sealing the joint from fluid leaks as well as electrical leaks (column 5, lines 49-50) whereby preserving the conductive fluid and making measurements more accurate.

Referring to claim 17, Murdock discloses the method as claimed except for the step of coupling a first annular electrode having a first inner diameter to a tubular portion comprises threadably coupling a first annular electrode having a first inner diameter to a tubular portion.

Jeter discloses threadably coupling a first annular electrode (fig. 1A (24)) having a first inner diameter to a tubular portion (column 5, lines 19-27).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the threaded connecting portion of Jeter into the method of

Murdock for the purpose of maintaining the continuity of the conduit of non-conductive material so that there is no fluid loss at the joints (column 5, lines 19-27).

6. Claims 4-6, 9, 10, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murdock in view of Colvin et al. (USPN 4,751,466).

Referring to claim 4, Murdock discloses the sensor as claimed except for a control circuit generating an output corresponding to a conductivity of a fluid between said first annular electrode and said second annular electrode.

Colvin et al. discloses a conductivity sensor with a control circuit (fig. 1) generating an output corresponding to a conductivity of a fluid (column 7, line 68 – column 8, line 3) between a first electrode (fig. 1 (12)) and a second electrode (fig. 1 (14)).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the control circuit of Colvin et al. into the conductivity sensor of Murdock for the purpose of controlling a procedure to increase the accuracy of conductivity measurements whereby making it possible to find the absolute conductivity of a fluid (column 8, lines 11-12).

Referring to claim 5, Murdock discloses the sensor as claimed except for a calibration circuit.

Colvin et al. discloses a conductivity sensor with a calibration circuit (column 8, lines 11-50).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the calibration circuit of Colvin et al. into the conductivity sensor

of Murdock for the purpose of providing a faster calibration time since only one calibration point is needed in addition to a zero conductance point (column 8, lines 36-46).

Referring to claim 6, Murdock discloses the sensor as claimed except for the calibration circuit comprising a zero adjustment circuit.

Colvin et al. discloses a conductivity sensor wherein the calibration circuit comprises a zero adjustment circuit (column 8, lines 40-50).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the zero adjustment circuit of Colvin et al. into the conductivity sensor of Murdock for the same purpose as given in claim 5, above.

Referring to claim 9, Murdock discloses the sensor as claimed except for a buffer circuit coupled to said first electrode.

Colvin et al. discloses a buffer circuit coupled to said first electrode (column 7, lines 11-39).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the buffer circuit of Colvin et al. into the conductivity sensor of Murdock for the purpose of controlling the voltage and current between the electrodes in order to maintain the sensitivity and accuracy of the apparatus (column 7, lines 35-44).

Referring to claim 10, Murdock discloses the sensor as claimed except for the control circuit being operational amplifier-based.

Colvin et al discloses the control circuit is operational amplifier-based (fig. 1).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the operational amplifier-based control circuit of Colvin et al. into the conductivity sensor of Murdock for the purpose of easily building an oscillator, a buffer, a current to voltage converter and a synchronous detector (fig. 1) whereby allowing improved control of all aspects of testing the conductivity of a fluid.

Referring to claim 18, Murdock discloses the method as claimed except for coupling a control circuit to said first annular electrode and said second annular electrode calibrating the control circuit.

Colvin et al. discloses coupling a control circuit to a first electrode (column 7, lines 30-36) and a second electrode calibrating the control circuit (column 8, lines 36-50).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the control circuit and calibration circuit of Colvin et al. into the method of Murdock for the same purpose as given in claims 4 and 5, above.

Referring to claim 19, Murdock discloses the method as claimed except where calibrating said control circuit comprises open circuit zeroing said control circuit.

Colvin et al. discloses a method wherein calibrating a control circuit comprises open circuit zeroing the control circuit (column 8, lines 40-50).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the zero adjustment circuit of Colvin et al. into the method of Murdock for the same purpose as given in claim 5, above.

7. Claims 7, 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murdock in view of Colvin et al. as applied to claims 5 and 18 above, and further in view of Carll (USPN 4,786,875).

Referring to claim 7, Murdock as modified discloses the sensor as claimed except for the calibration circuit comprising a gain adjustment circuit.

Carll discloses a gain adjustment circuit (column 6, lines 12-19) for a conductivity sensor.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the gain adjustment circuit of Carll into the conductivity sensor of Murdock as modified for the purpose of simulating cell drop for use in circuit calibration (column 6, lines 19-24) whereby providing an improved calibration method.

Referring to claim 8, Murdock as modified discloses the sensor as claimed except for the gain adjustment circuit being coupled to said first electrode.

Carll discloses the gain adjustment circuit (column 6, lines 12-19) is coupled to said first electrode (Fig. 3 (54)). It should be noted that input terminal (54) in fig. 3 is connected to the conductivity cell (column 4, lines 25-27).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate coupling the gain adjustment circuit to the first electrode of Carll into the conductivity sensor of Murdock as modified for the same purpose as stated in claim 7, above.

Referring to claim 20, Murdock as modified discloses the method as claimed except where calibrating the control circuit comprises adjusting the gain of a buffer circuit.

Carll discloses a method wherein calibrating the control circuit comprises adjusting the gain of a buffer circuit (column 10, lines 42-55).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the gain-adjusting step of Carll into the method of Murdock as modified for the same purpose as given in claim 7, above.

8. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murdock in view of Jeter, and further in view of Colvin et al.

Referring to claim 11, Murdock discloses a conductivity sensor (fig. 2) for coupling in a coolant path comprising: a first annular electrode having a first inner diameter and a first outer diameter (fig. 2 (18)); a second annular electrode having a second inner diameter and a second outer diameter (fig. 2 (19)); and a tubular portion (fig. 2 (12) and (13)) disposed axially between said first electrode and said second electrode (fig. 2), said tubular portion having a third inner diameter greater than said first inner diameter and said second inner diameter (fig. 2), said tubular portion said first electrode and said second electrode defining a sensor cell having said third inner diameter (fig. 2), said cell having a cell length between said first electrode and said second electrode (column 3, lines 9-51); said first electrode and said second electrode extending axially from said tubular portion (fig. 2). so that said coolant path may be coupled to the first electrode and the second electrode.

Murdock does not disclose said first annular electrode having a first threaded portion said first outer diameter or said second annular electrode having a second threaded portion said second outer diameter or that a cooling path may be coupled to the first electrode and the second electrode.

Jeter discloses a first threaded portion being a first outer diameter and a second threaded portion being a second outer diameter (fig. 2). It should be noted that while Jeter only discloses a first threaded portion, that multiple joints may be incorporated into each line (column 4, lines 35-36); therefore a second threaded portion would exist.

Colvin et al. discloses a conductivity sensor wherein a cooling path may be coupled to the first electrode and the second electrode (fig. 1 and column 5, lines 20-24).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the threaded connecting portion of Jeter into the conductivity sensor of Murdock for the purpose of maintaining the continuity of the conduit of non-conductive material so that there is no fluid loss at the joints (column 5, lines 19-27).

Referring to claim 12, Murdock discloses said first inner diameter and said second inner diameter are equivalent (fig. 2).

Referring to claim 13, Murdock discloses said first outer diameter and said second outer diameter are equivalent (fig. 2).

Referring to claim 14, Murdock discloses the sensor as claimed except for a seal material between said first annular electrode and said tubular portion.

Jeter discloses a sensor with a seal material (column 5, line 47-49) between a first annular electrode (fig. 1A (24)) and a tubular portion (fig. 1B).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the seal material of Jeter into the conductivity sensor of Murdock for the same purpose as given in claim 3, above.

Referring to claim 15, Murdock discloses the sensor as claimed except for said seal material comprising polytetrafluoroethylene.

Jeter discloses a seal material comprising polytetrafluoroethylene (column 5, lines 47-51).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the seal material comprising polytetrafluoroethylene of Jeter into the conductivity sensor of Murdock for the same purpose as given in claim 3, above.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 11 and 16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Dole whose telephone number is 703-305-7396. The examiner can normally be reached on Mon. thru Fri. from 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on 703-308-0750. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TJD

N. Le
Supervisory Patent Examiner
Technology Center 2800